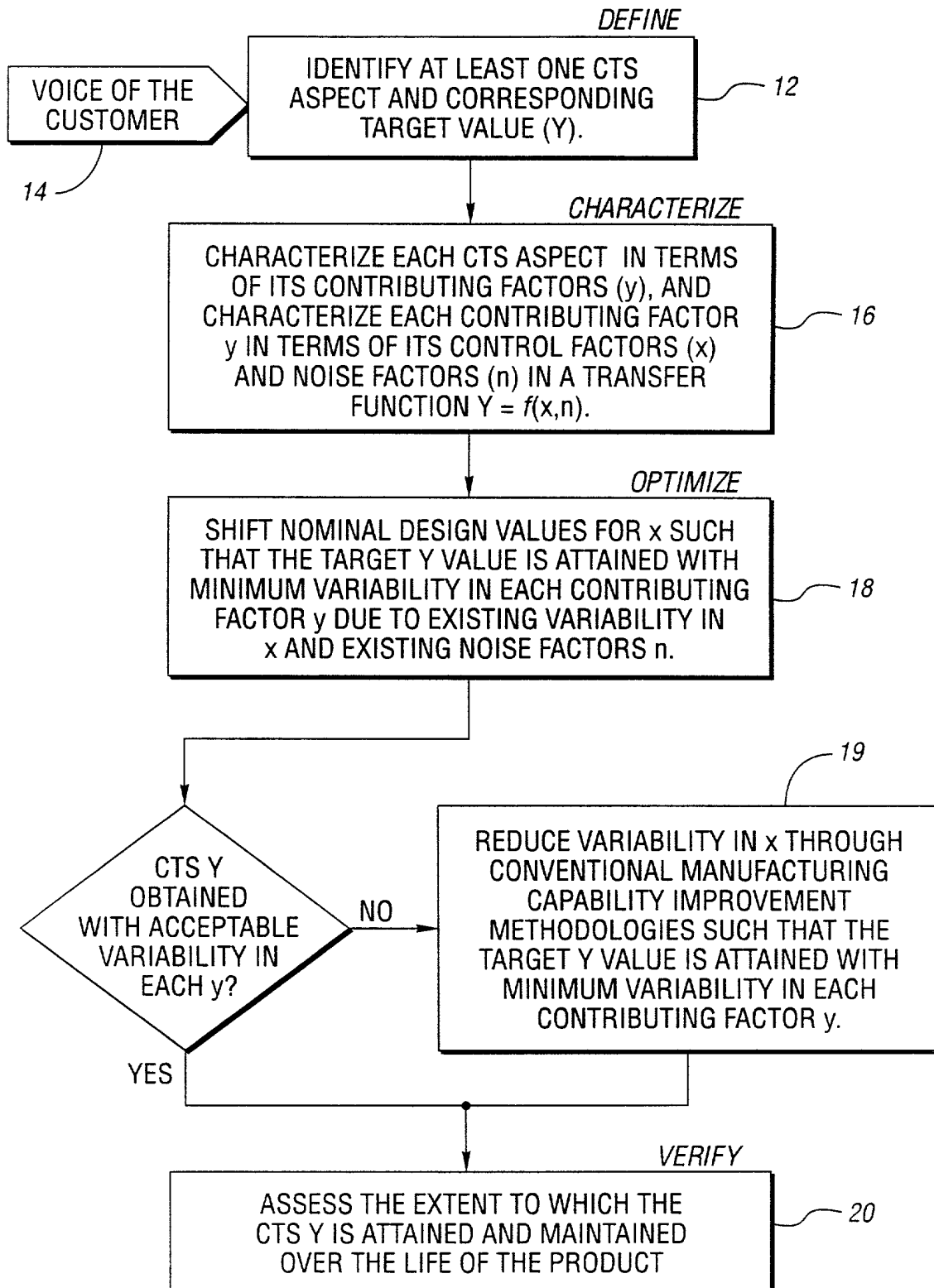


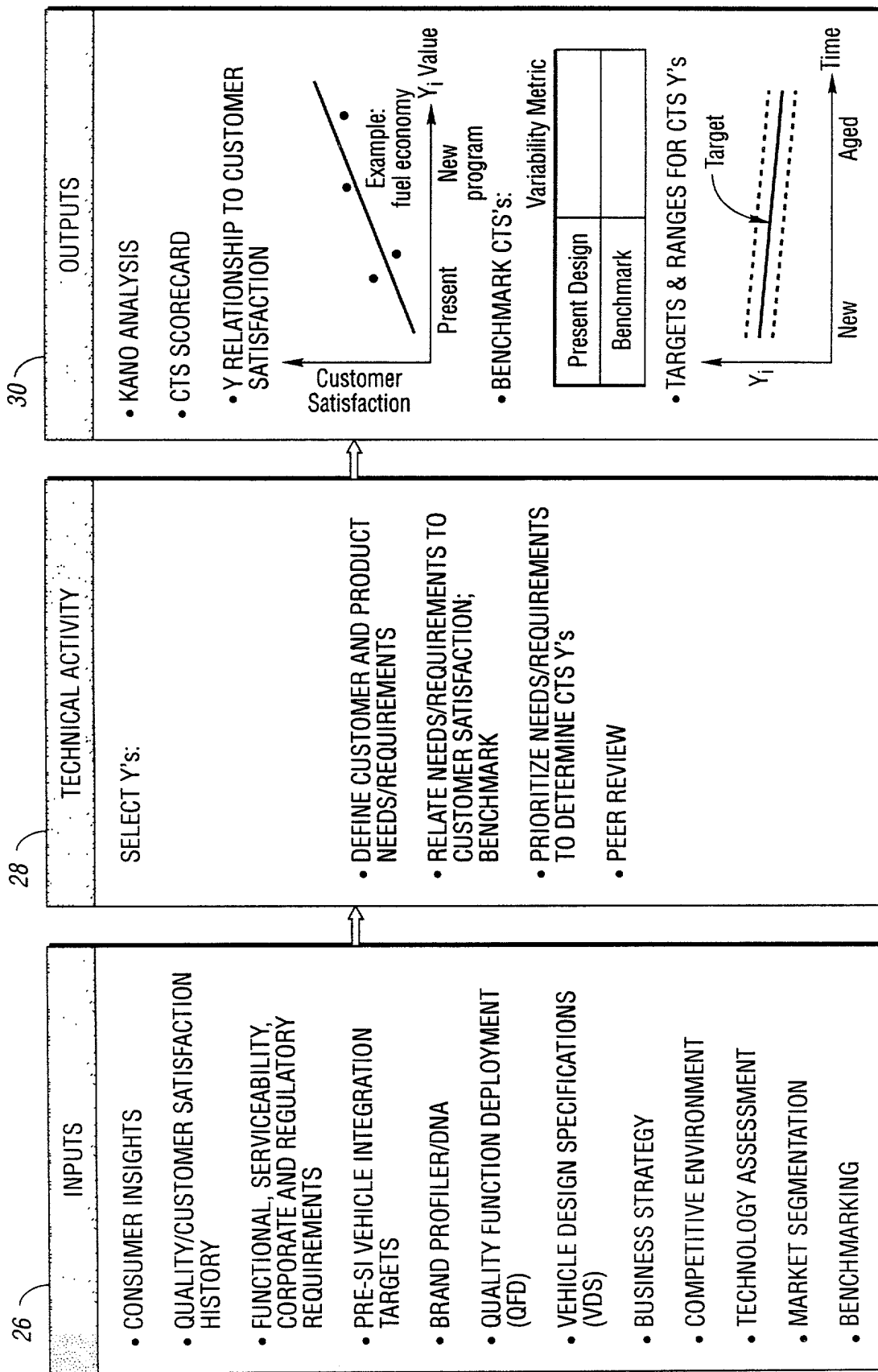
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*Fig. 1*

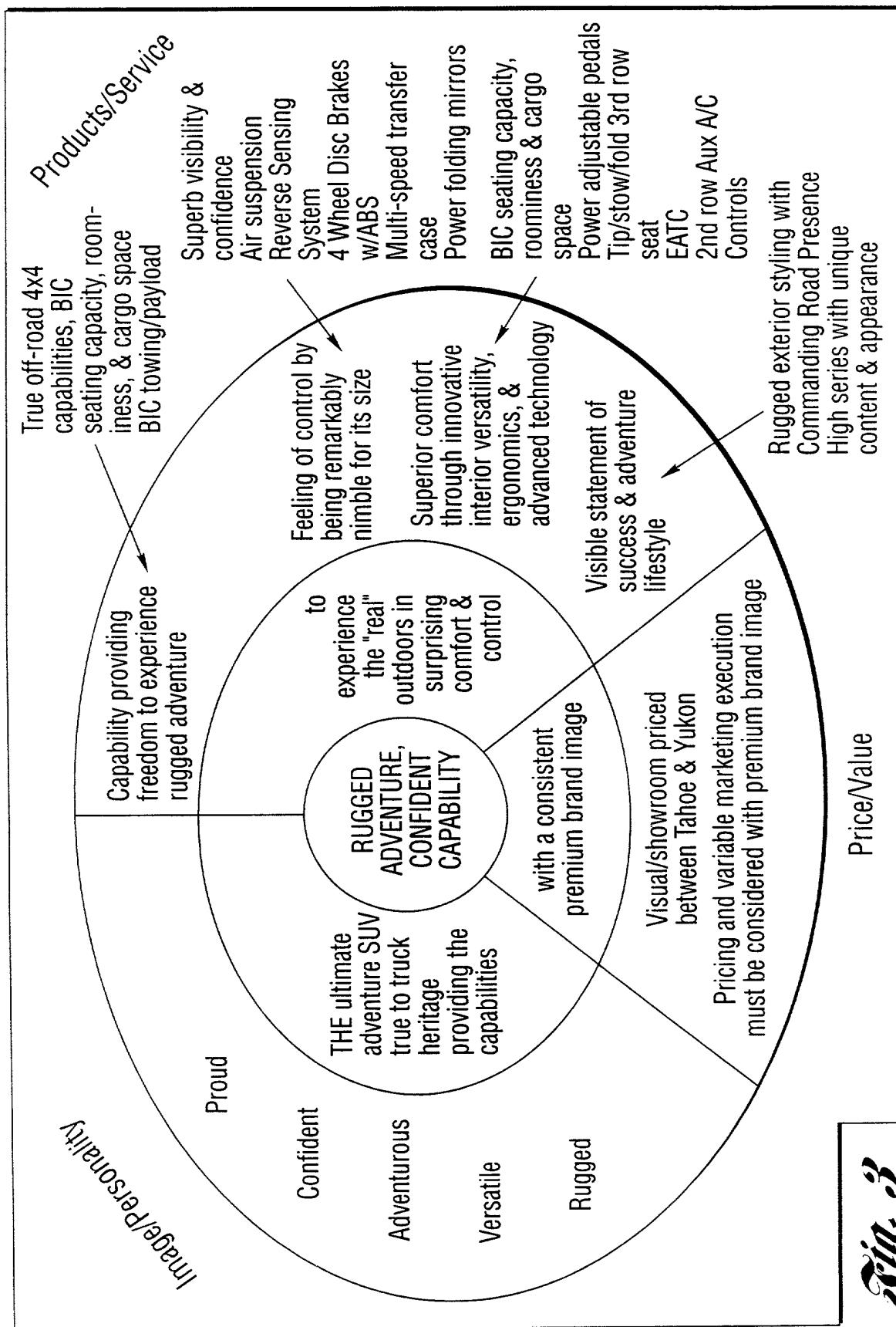
10

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*Fig. 2*

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**Fig. 3**

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ATTRIBUTE	ATTRIBUTE CLASS	PRIORITY (RANK)	PRIMARY BRAND POSITIONING	NAMEPLATE BRAND POSITIONING	PROGRAM SPECIFICS		PRESENT NAMEPLATE ENTRY
					TARGET OBJECTIVES	STATUS	
USAGE EXPERIENCE							
INTERIOR ROOMINESS	D	1	(L) A C M	(L) A C M	L A C M	L A C M	(L) A C U
ERGONOMICS/FLEXIBILITY/COMFORT	D	2	L (A) C M	(L) A C M	L A C M	L A C M	(L) A C U
LUGGAGE/CARGO SPACE	D	3	(L) A C M	(L) A C M	L A C M	L A C M	L (A) C U
DURABILITY/CRAFTMANSHIP	D	6	L (A) C M	L (A) C M	L A C M	L A C M	L (A) C U
QUIETNESS	I	8	L (A) C M	L (A) C M	L A C M	L A C M	L (A) C U
EASE OF ENTRY/EXIT	I	11	L (A) C M	L (A) C M	L A C M	L A C M	L (A) C U
RANGE/FUEL ECONOMY	G	15	L (A) C M	L (A) C M	L A C M	L A C M	L (A) C U
CLIMATE CONTROL	G	17	(L) A C M	L A (C) M	L A C M	L A C M	(L) A C U
EXTERIOR VISIBILITY	G	20	L (A) C M	L A (C) M	L A C M	L A C M	(L) A C U
COST OF OWNERSHIP	G	25	(L) A C M	L A (C) M	L A C M	L A C M	L (A) C U
DRIVING EXPERIENCE							
PERFORMANCE/TOWING	D	4	L (A) C M	(L) A C M	L A C M	L A C M	(L) A C U
RIDE	I	9	L (A) C M	L (A) C M	L A C M	L A C M	L (A) C U

**Fig. 4** :

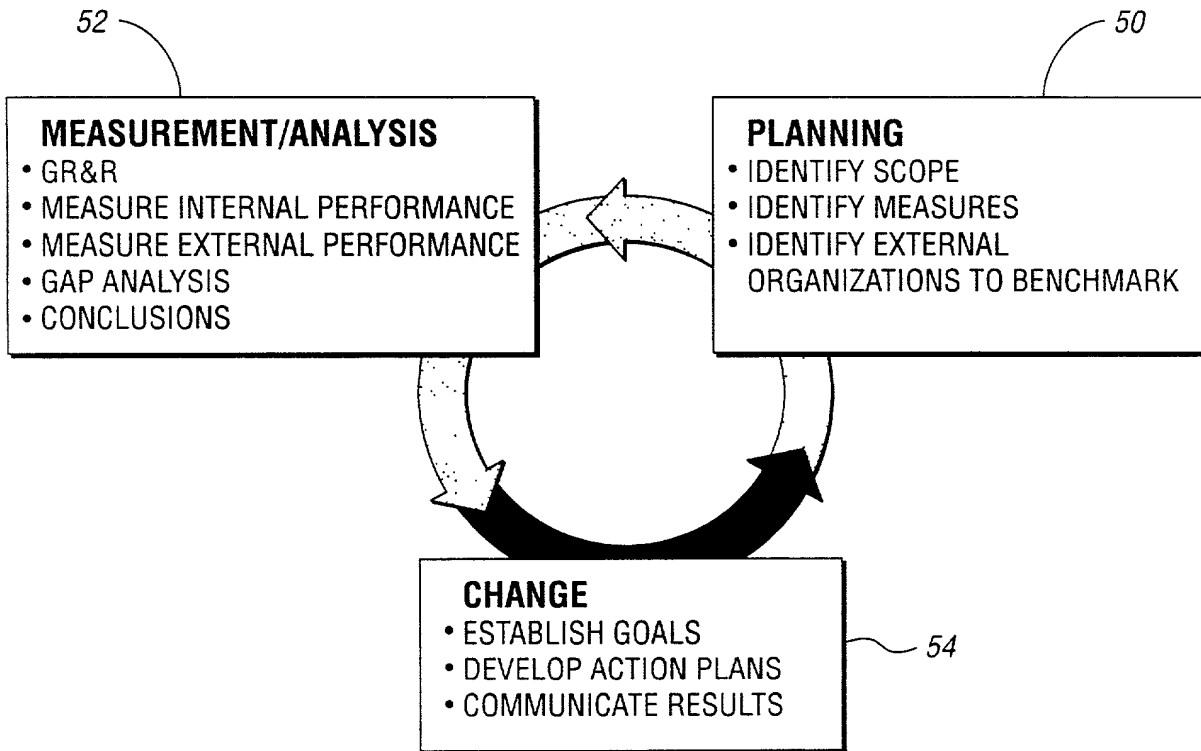
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**% SATISFACTION vs. RELATIVE LEVERAGE**

RELATIVE LEVERAGE Median	<b>IMPROVE...</b> HIGH LEVERAGE ON OVERALL SATISFACTION, FEWER CUSTOMERS SATISFIED	<b>SUSTAIN/BUILD...</b> HIGHER LEVERAGE ON OVERALL SATISFACTION, MORE CUSTOMERS SATISFIED
	<b>REVIEW...</b> LOWER LEVERAGE ON OVERALL SATISFACTION, FEWER CUSTOMERS SATISFIED, PAY PARTICULAR ATTENTION TO DISAPPOINTMENTS	<b>MAINTAIN...</b> LOWER LEVERAGE ON OVERALL SATISFACTION, MORE CUSTOMERS SATISFIED

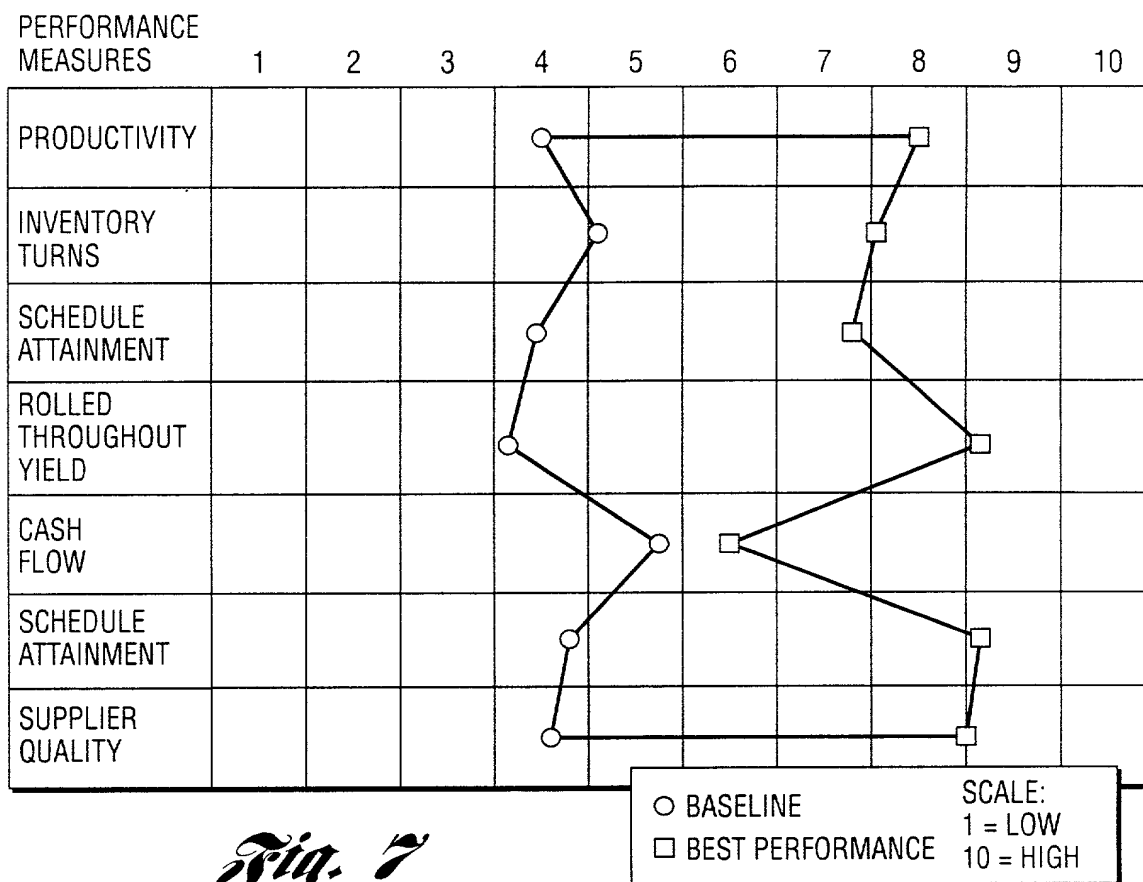
Median  
% HIGH SATISFACTION

*Fig. 5*



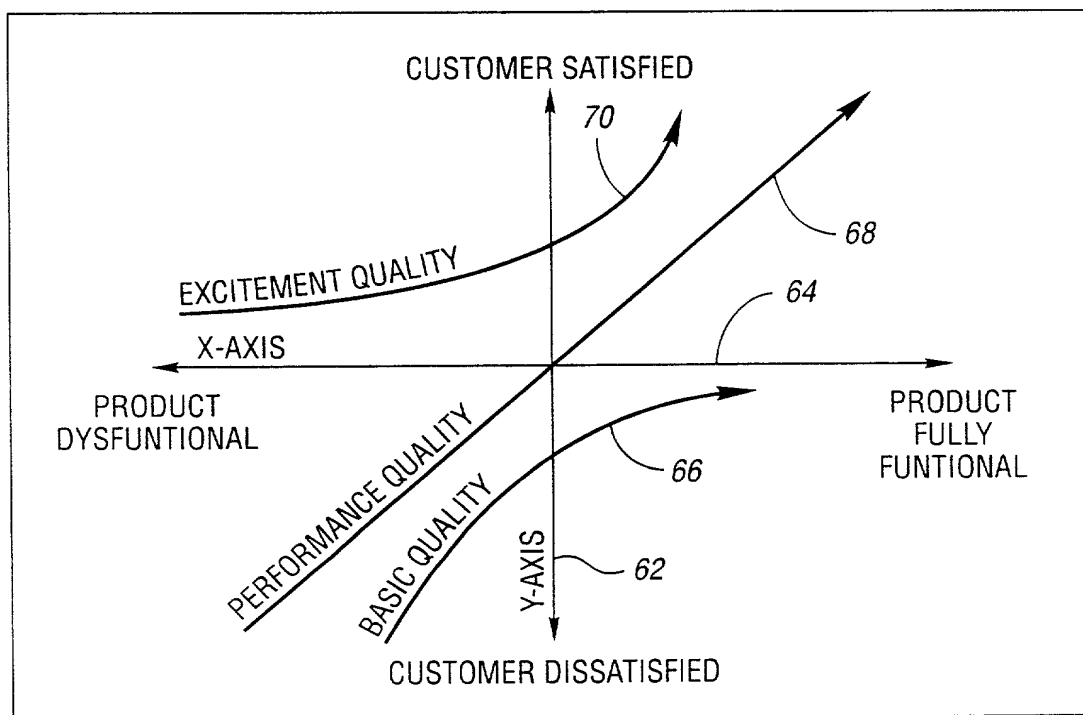
*Fig. 6*

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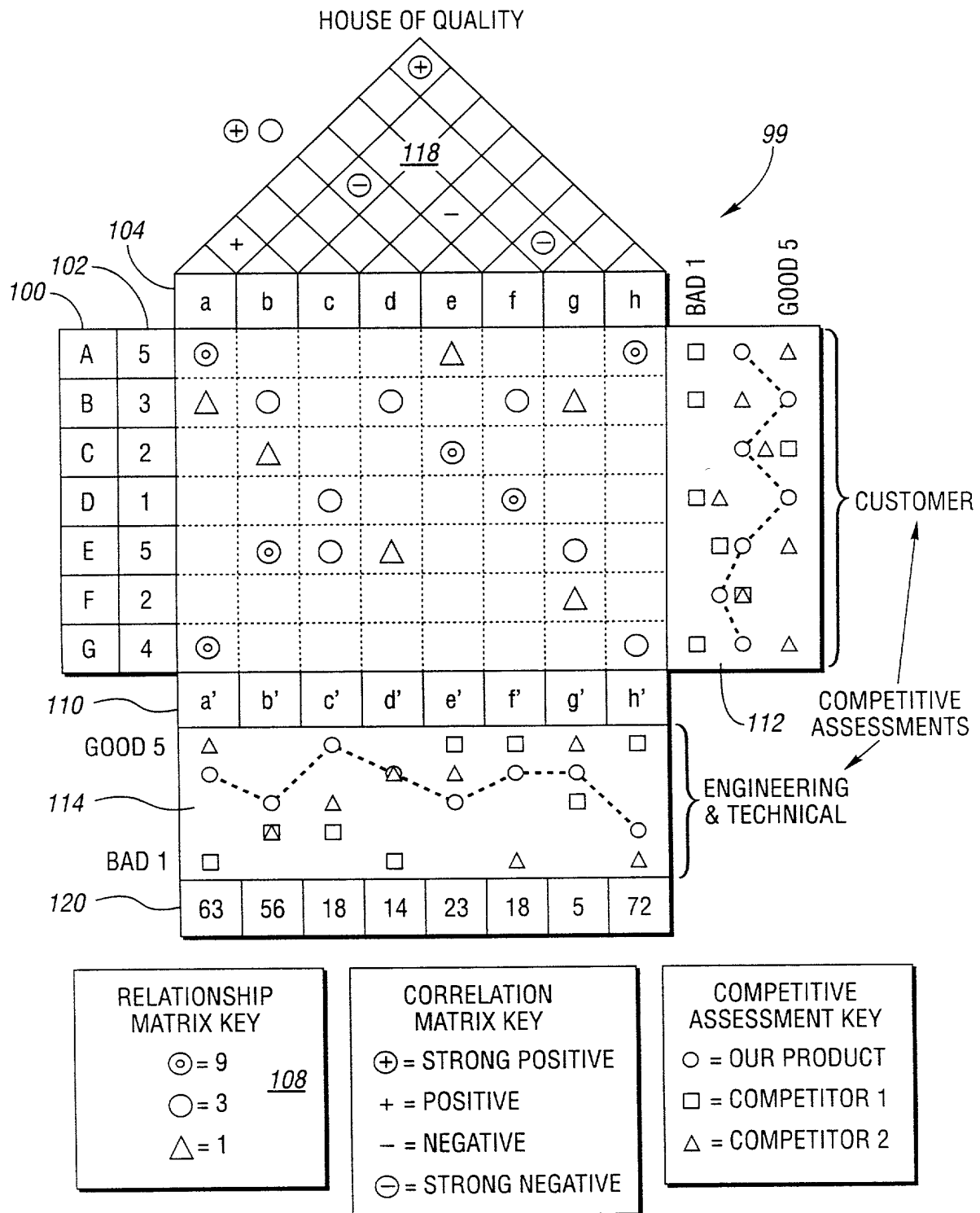
*Fig. 7*

KANO ANALYSIS



*Fig. 8*

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*Fig. 9*

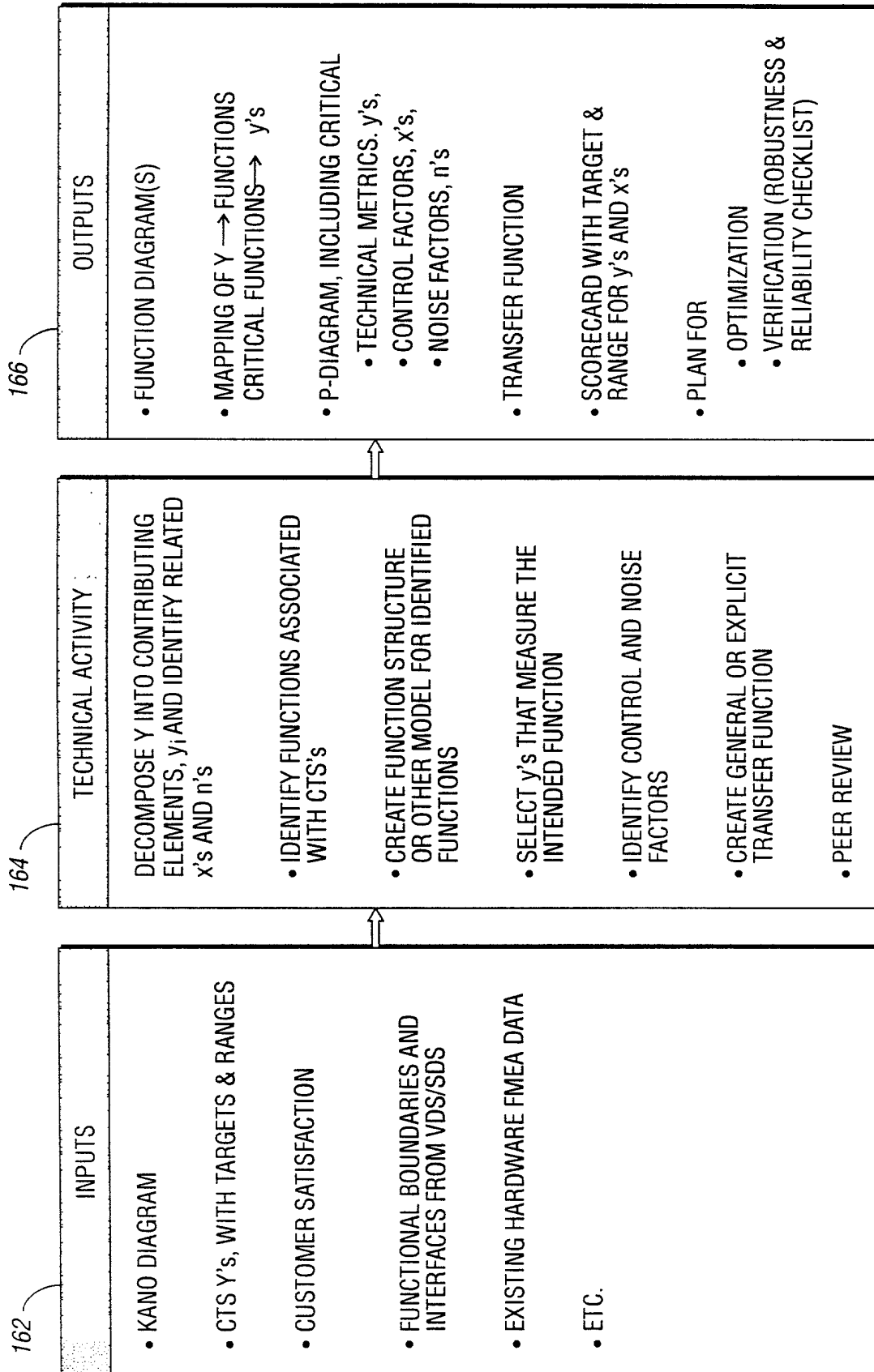
**10**

## Status of Items Critical to Satisfaction and Relationship to Customer

[illegible]



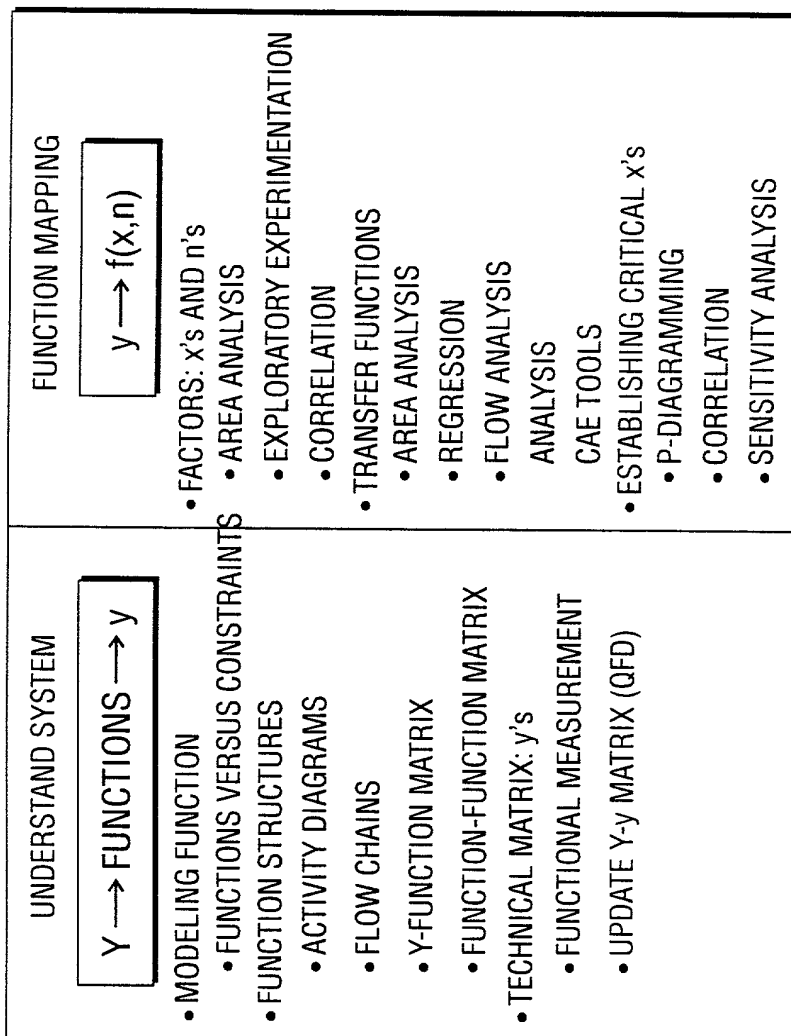
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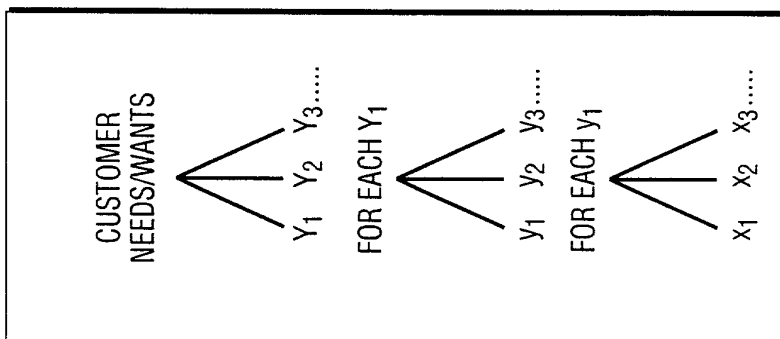
*Fig. 11*

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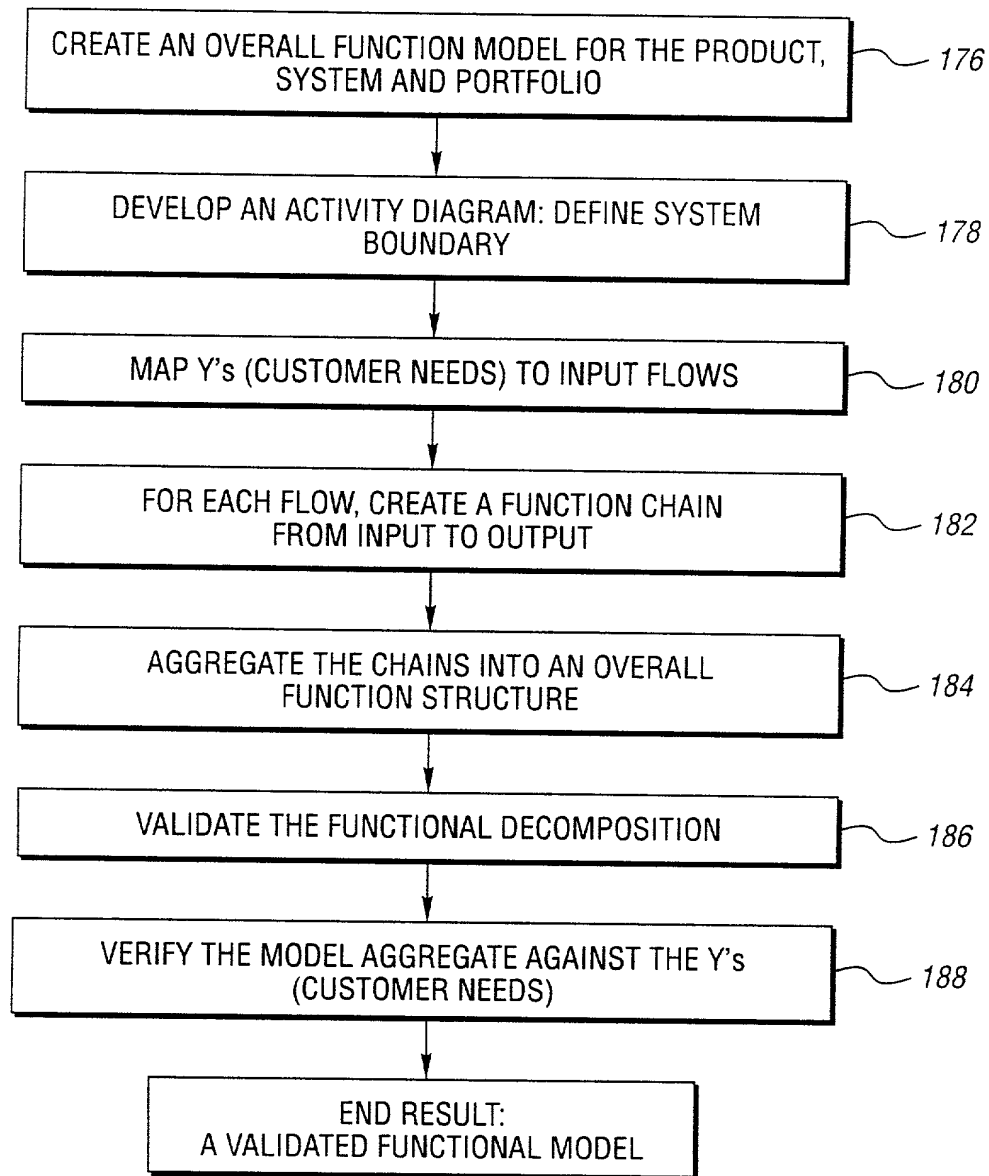


*Fig. 12b*



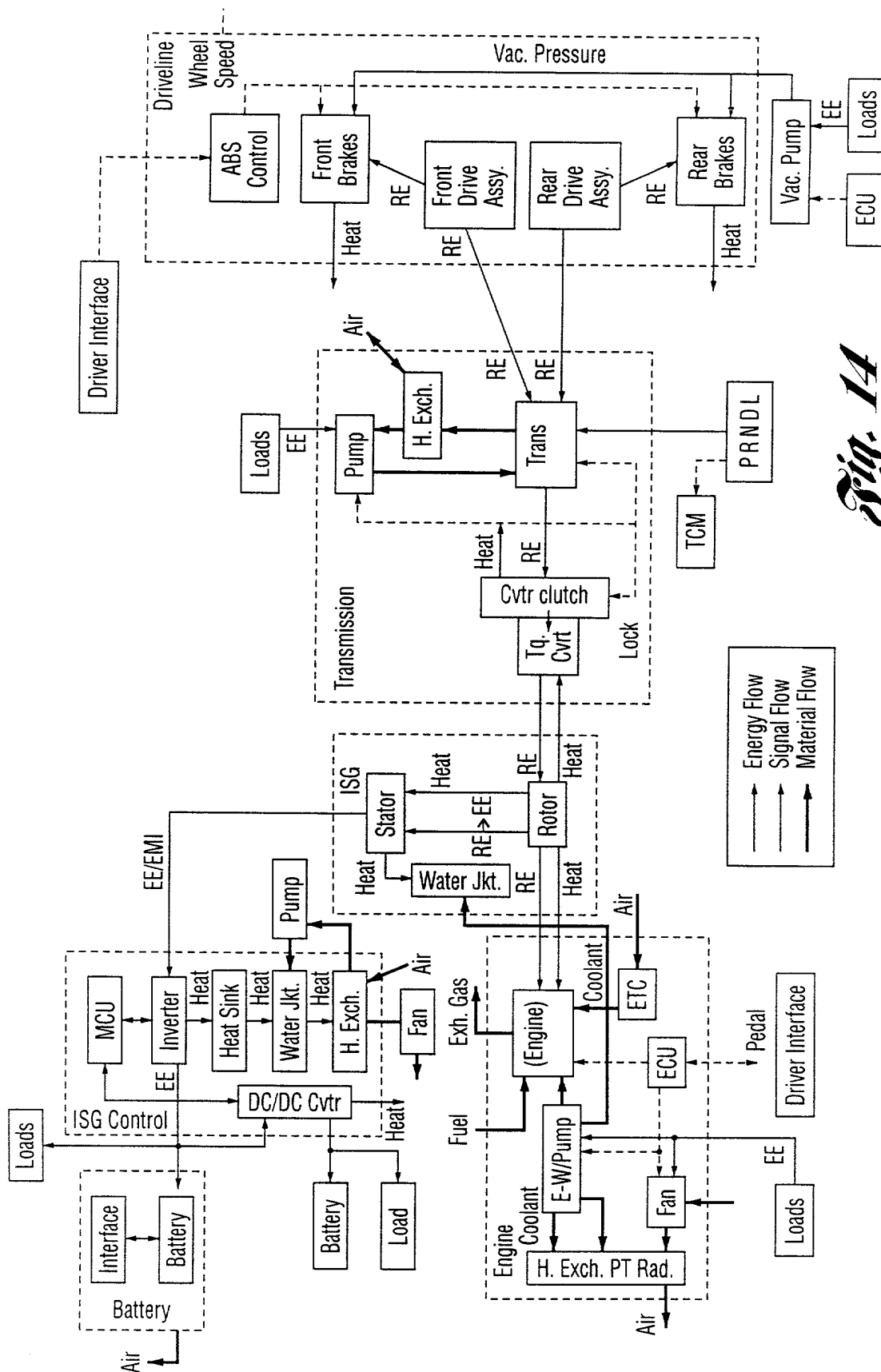
*Fig. 12a*

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*Fig. 13*



**Fig. 14**

## TRANSFER FUNCTIONS

- A QUANTITATIVE RELATIONSHIP BETWEEN DEPENDENT AND INDEPENDENT VARIABLES THAT CAN BE EXPRESSED AS AN EQUATION OF THE FORM

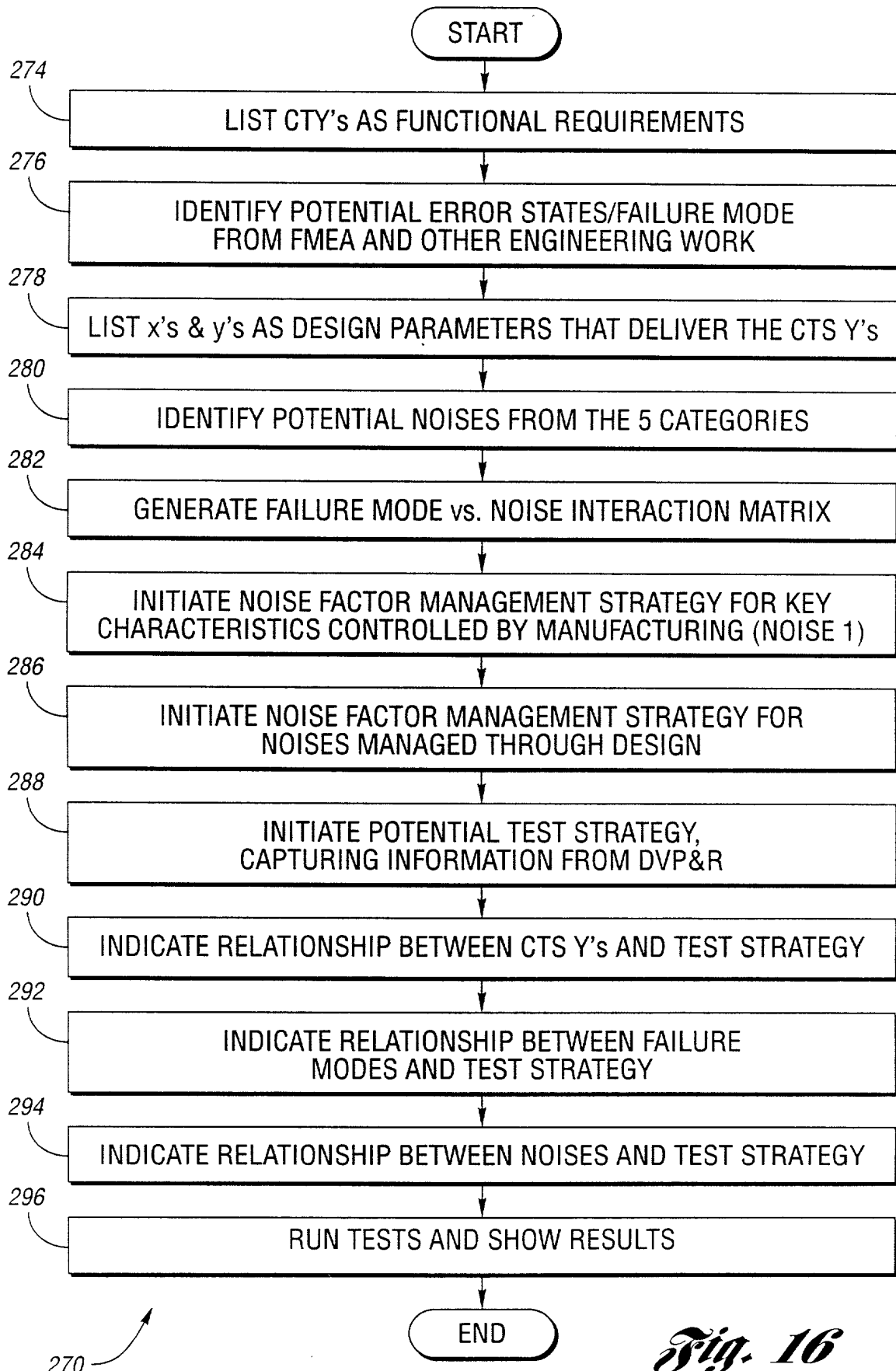
$$\left. \begin{array}{l} Y = F(y_1, \dots, y_n) \\ \text{OR} \\ y = f(x_1, \dots, x_n) \end{array} \right\} 190$$

- ACTUAL TRANSFER FUNCTION MAY LOOK SOMETHING LIKE THIS

$$\left. \begin{array}{l} Y = \alpha \sin y_1 + \beta \cos y_2 + \gamma y_3, \\ y = \beta_0 + \beta_1 x_1^{\alpha_1} + \beta_2 x_2^{\alpha_2} + \beta_3 x_3^{\alpha_3} + \lambda_1 n_1, \\ \text{etc.} \end{array} \right\} 192$$

*Fig. 15*

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*Fig. 16*

PROGRAM		Design Parameters										Test Name								
System/Sub-system/Component		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9
Reliability & Robustness Checklist																				
Functional Requirement Life Target (for the subject component/system)																				
CTS # 1:																				
CTS # 2:																				
CTS # 3:																				
CTS # 4:																				
CTS # 5:																				
CTS # 6:																				
CTS # 7:																				
CTS # 9:																				
ERROR STATES/FAILURE MODE -potential TGV, negated function and/or "Noises" for other sub-systems																				
300																				
Show interactions between Failure Modes and Noise Factors																				
312																				
314																				
316																				

*Fig. 17a*

[illegible]

*176*

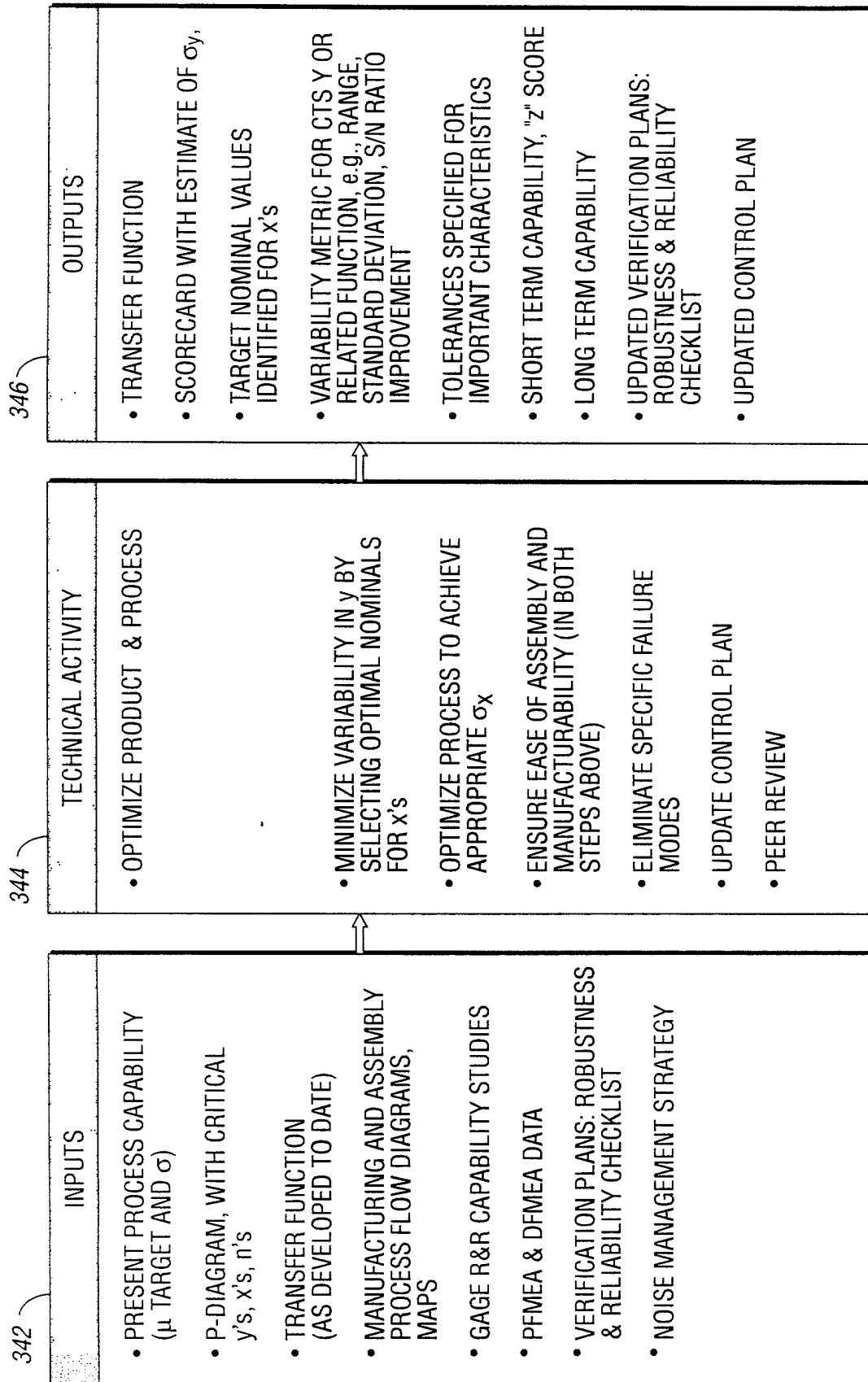
310

308

306



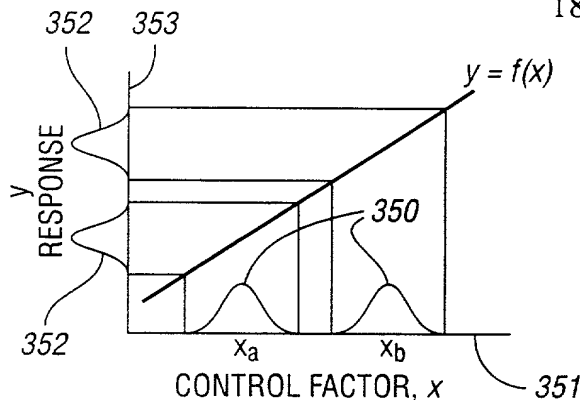
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*Fig. 18*

340

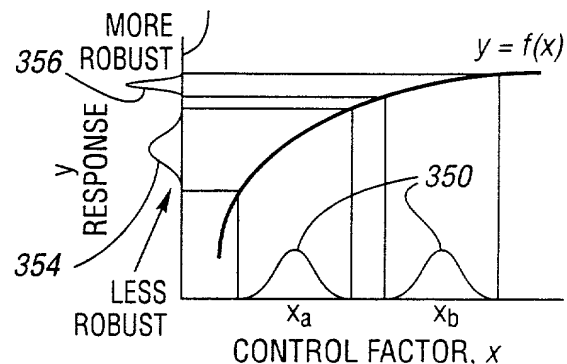
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**"SHIFT"**

- WHEN  $f(x)$  IS LINEAR, THE NOMINAL VALUE OF THE CONTROL FACTOR  $x$  HAS NO EFFECT ON THE VARIABILITY OF THE RESPONSE,  $f(x)$ .
- CHANGE THE LEVEL OF THIS CONTROL FACTOR TO SHIFT THE RESPONSE WITHOUT AFFECTING VARIABILITY.

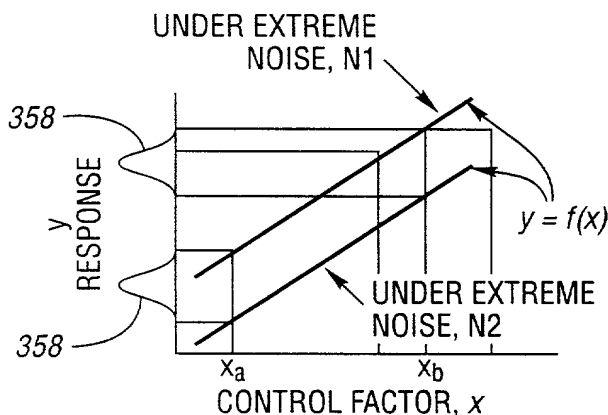
*Fig. 19a*



**"SHRINK"**

- WHEN  $f(x)$  IS NON-LINEAR, THE NOMINAL VALUE OF THE CONTROL FACTOR  $x$  CAN HAVE A MAJOR EFFECT ON THE VARIABILITY OF THE RESPONSE,  $f(x)$ .
- CHANGE THE LEVEL OF THIS CONTROL FACTOR TO DESENSITIZE THE RESPONSE TO THE CONTROL FACTOR VARIABILITY.

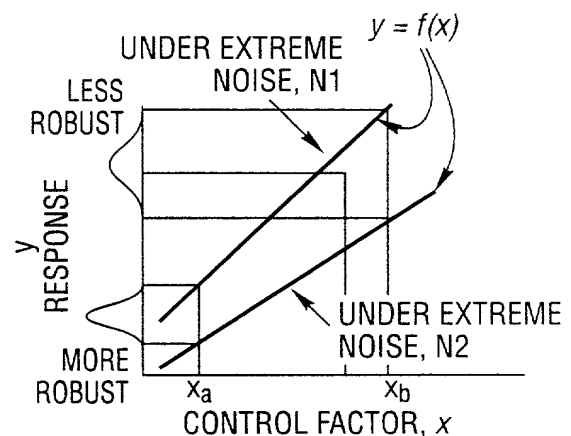
*Fig. 19b*



**"SHIFT"**

- WHEN THE CONTROL FACTOR  $x$  DOES NOT INTERACT WITH THE NOISE, THE NOMINAL VALUE OF  $x$  HAS NO EFFECT ON THE RESPONSE VARIABILITY.
- CHANGE THE LEVEL OF THIS CONTROL FACTOR TO SHIFT THE RESPONSE WITHOUT AFFECTING VARIABILITY.

*Fig. 20a*



**"SHRINK"**

- WHEN THE CONTROL FACTOR  $x$  INTERACTS WITH THE NOISE, THE NOMINAL VALUE OF  $x$  CAN HAVE A MAJOR EFFECT ON RESPONSE VARIABILITY.
- CHANGE THE LEVEL OF THIS CONTROL FACTOR TO DESENSITIZE PERFORMANCE TO THE NOISE AND SHRINK THE RESPONSE VARIABILITY.

*Fig. 20b*

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Vehicle/Part Name:			<u>5.4L Engine Compression Ratio</u>		
Description:			<u>Compression Ratio Contribution to Engine Quietness</u>		

Performance		Transfer Function	
Characteristic	Units	Y/N	Formula (enter here)
CR	Ratio	Y	$y = f(x, n)$

Variables			Range		Contribution
No.	Characteristic	Units	Min	Max	Sensitivity
1	Cyl Hd Cmbr Vol	cc			-0.27
2	Blk Dk Crk/Deck Cl	mm	255.91	256.04	-0.12
3	Head Gasket Thk	mm	0.97	1.06	-0.055
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Cell Shading Key	
	Enter Data
	Do not enter data (Calculation)

Confidence Ratings	
High (H)	Estimate based on customer-correlated model of same parts
Med (M)	Estimate based on partial customer correlation or surrogate parts
Low (L)	Estimate without customer correlation or no process data available

370

*Fig. 21a*

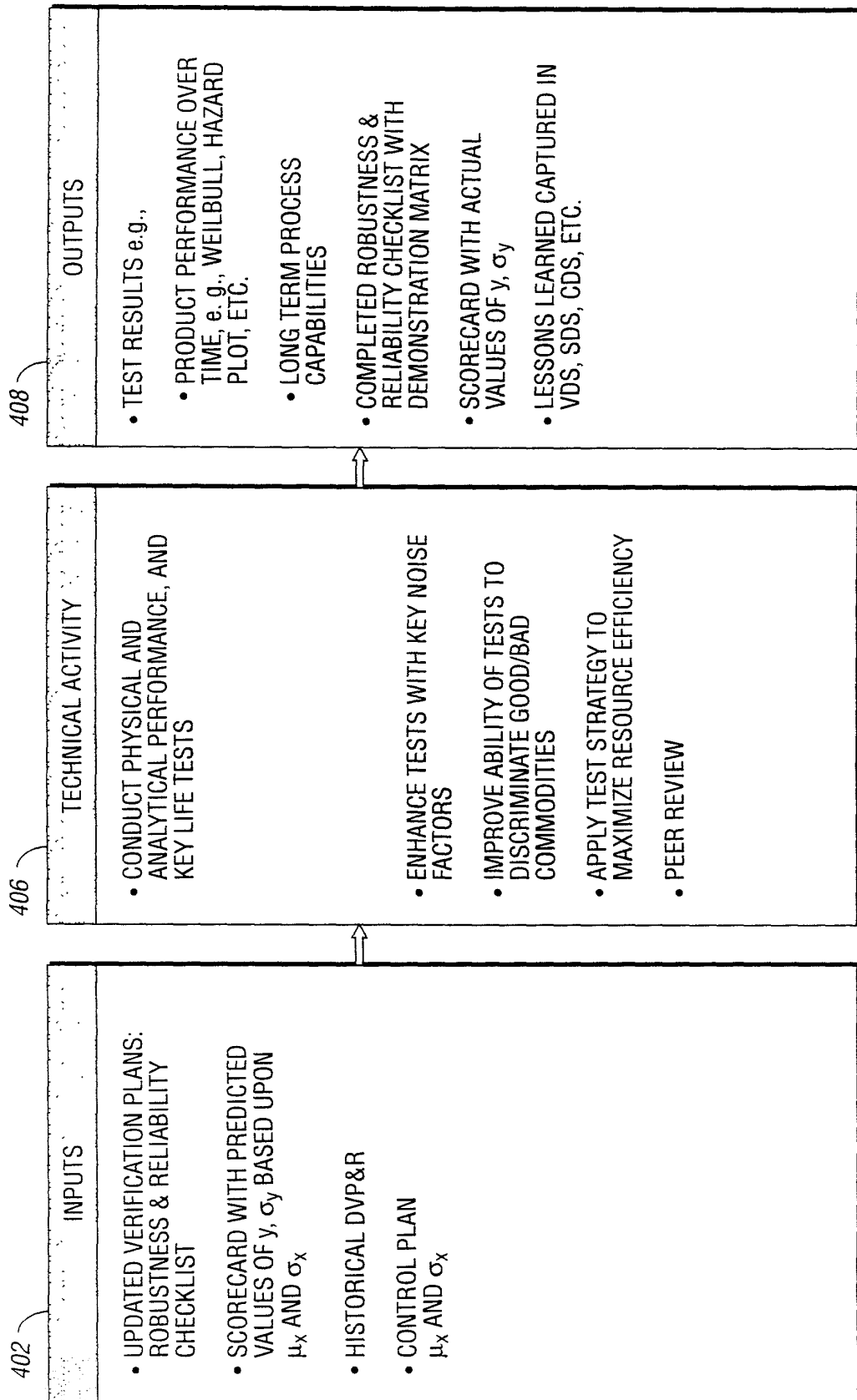
x's, Input Control Factors			384		390		386	
to Variability	Specification		Sample/Database Statistics					
%	LSL	USL	mean: $\mu$	s.d.: $\sigma$	Short/Long	Confidence		
99.89%	42.45	45.45	44.36	0.35	short	H		
0.09%	255.875	256.125	255.924	0.02403	short	H		
0.02%	0.9	1.12	1.01536	0.02146	short	H		

[illegible][illegible]

	Enter Formula (must refer to cells J13, J14, ... representing $x_1$ , $x_2$ , ...)
	Do not enter data (Not applicable for Noise Factors)

*Fig. 216*

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*Fig. 22*

400